the required certification date for the flow monitor.

Whenever the owner or operator successfully demonstrates that modifications to the exhaust duct or stack (such as installation of straightening vanes, modifications of ductwork, and the like) are necessary for the flow monitor to meet the performance specifications, the Administrator may approve an interim alternative flow monitoring methodology and an extension to the required certification date for the flow monitor.

Where no location exists that satisfies the physical siting criteria in section 1.2.1, where the results of flow profile studies performed at two or more alternative flow monitor locations are unacceptable, or where installation of a flow monitor in either the stack or the ducts is demonstrated to be technically infeasible, the owner or operator may petition the Administrator for an alternative method for monitoring flow.

2. EQUIPMENT SPECIFICATIONS

2.1 Instrument Span

In implementing sections 2.1.1 through 2.1.4 of this appendix, to the extent practicable, measure at a range such that the majority of readings obtained during normal operation are between 25 and 75 percent of full-scale range of the instrument.

2.1.1 SO_2 Pollutant Concentration Monitors

Determine, as indicated below, the span value for an SO_2 pollutant concentration monitor so that all expected concentrations can be accurately measured and recorded.

2.1.1.1 Maximum Potential Concentration

The monitor must be capable of accurately measuring up to 125 percent of the maximum potential concentration (MPC) as calculated using Equation A–1a or A–1b. Calculate the maximum potential concentration by using Equation A–1a or A–1b and the maximum percent sulfur and minimum gross calorific value (GCV) for the highest sulfur fuel to be burned, using daily fuel sample data if they are available. If an SO_2 CEMS is already installed, the owner or operator may determine an MPC based upon the maximum concentration observed during the previous 30 unit operating days when using the type of fuel to be burned. For initial certification, base the maximum percent sulfur and minimum GCV on the results of all available fuel sampling and analysis data from the previous 12 months (where such data exists). If

the unit has not been operated during that period, use the maximum sulfur content and minimum GCV from the fuel contract for fuel that will be combusted by the unit. Whenever the fuel supply changes such that these maximum sulfur and minimum GCV values may change significantly, base the maximum percent sulfur and minimum GCV on the new fuel with the highest sulfur content. Use the one of the two following methods that results in a higher MPC: (1) results of samples representative of the new fuel supply, or (2) maximum sulfur and minimum GCV from the fuel contract for fuel that will be combusted by the unit. Whenever performing fuel sampling to determine the MPC, use ASTM Methods ASTM D3177–89, ''Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke,'' ASTM D4239–85, ''Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods,'' ASTM D4294–90, ''Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy,'' ASTM D1552–90, ''Standard Test Method for Sulfur in Petroleum Products (High Temperature Method),'' ASTM D129–91, ''Standard Test Method for Sulfur in Petroleum Products (General Bomb Method),'' or ASTM D2622–92, ''Standard Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry'' for sulfur content of solid or liquid fuels, or ASTM D3176–89, ''Standard Practice for Ultimate Analysis of Coal and Coke'', ASTM D240–87 (Reapproved 1991), ''Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter'', or ASTM D2015–91, ''Standard Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter'' for GCV (incorporated by reference under §75.6). Multiply the maximum potential concentration by 125 percent, and round up the resultant concentration to the nearest multiple of 100 ppm to determine the span value. The span value will be used to determine the concentrations of the calibration gases. Include the full-scale range setting and calculations of the span and MPC in the monitoring plan for the unit. Select the full-scale range of the instrument to be consistent with section 2.1 of this appendix, and to be greater than or equal to the span value. This selected monitor range with a span rounded up from 125 percent of the maximum potential concentration will be the ''high-scale'' of the SO_2 pollutant concentration monitor.

$$MPC = 11.32 \times 10^{6} \left(\frac{\%S}{GCV} \right) \left(\frac{20.9 - \%O_{2w}}{20.9} \right) \qquad (Eq.\ A\text{–}1a)$$

or

$$MPC = 66.93 \times 10^{6} \left(\frac{\%S}{GCV} \right) \left(\frac{\%CO_{2w}}{100} \right) \qquad (Eq.\ A\text{–}1b)$$

Where,

MPC=Maximum potential concentration (ppm, wet basis). (To convert to dry basis, divide the MPC by 0.9.)

%S=Maximum sulfur content of fuel to be fired, wet basis, weight percent, as determined by ASTM D3177–89, ASTM D4239–85, ASTM D4294–90, ASTM D1552–90, ASTM D129–91, or ASTM D2622–92 for solid or liquid fuels (incorporated by reference under §75.6).

GCV=Minimum gross calorific value of the fuel lot consistent with the sulfur analysis (Btu/lb), as determined using ASTM D3176–89, ASTM D240–87 (Reapproved 1991), or ASTM D2015–91 (incorporated by reference under §75.6).

%O$_{2w}$=Minimum oxygen concentration, percent wet basis, under normal operating conditions.

%CO$_{2w}$=Maximum carbon dioxide concentration, percent wet basis, under normal operating conditions.

11.32×10⁶=Oxygen-based conversion factor in (Btu/lb)(ppm)/%.

6.93×10⁶=Carbon dioxide-based conversion factor in (Btu/lb)(ppm)/%

NOTE: All percent values to be inserted in the equations of this section are to be expressed as a percentage, not a fractional value, e.g., 3, not .03.

2.1.1.2 Maximum Expected Concentration

If the majority of SO$_2$ concentration values are predicted to be less than 25 percent of the full-scale range of the instrument selected under section 2.1.1.1 of this appendix, (e.g., where an SO$_2$ add-on emission control is used or where fuel with different sulfur contents are blended), use an additional (lower) measurement range. For this second range, use Equation A–2 to calculate the maximum expected concentration (MEC) for units with emission controls. For units blending fuels, calculate the MEC using a best estimate of the highest sulfur content and lowest gross calorific value expected for the blend and inserting these values into Equation A–1. If an SO$_2$ CEMS is already installed, the owner or operator may calculate an MEC based upon the maximum concentration measured by the CEMS over a thirty-day period, provided that there have been no full-scale exceedances since the range was last selected. Multiply the maximum expected concentration by 125 percent, and round up the resultant concentration to the nearest multiple of 10 ppm to determine the span value for the additional (lower) range. The span value of this additional range will also be used to determine concentrations of the calibration gases for this additional range. Report the full-scale range setting and calculations of the MEC and span in the monitoring plan for the unit. Select the full-scale range of the instrument of this additional (lower) range to be consistent with section 2.1 of this appendix, and to be greater than or equal to the lower range span value. This selected monitor range with a span rounded up from 125 percent of the MEC will be the ''low-scale'' of the SO$_2$ pollutant concentration monitor. Units using a low-scale range must also be capable of accurately measuring the anticipated concentrations up to and including 125 percent of the maximum potential concentration. If an existing State, local, or Federal requirement for span of an SO$_2$ pollutant concentration monitor requires a span other than that required in this section, but less than that required for the high-scale by this appendix, the State, local or Federal span value may be approved, where a satisfactory explanation is included in the monitoring plan.

MEC=MPC[(100–RE)/100]   (Eq. A–2)

Where:

MEC=Maximum expected concentration (ppm).

MPC=Maximum potential concentration (ppm), as determined by Eq. A–1a or A–1b.

RE = Expected average design removal efficiency of control equipment (%).

2.1.1.3 Auto-ranging Monitors

For monitors that can continuously and automatically adjust their range of measurement, the monitor must be capable at any time of accurately measuring up to 125 percent of the maximum potential concentration, as calculated using Equation A–1a or A–1b. Define the span value(s) for an auto-